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Kimball Avenue, Skokie, IL 60076 (US). **TIWARI, Vaibhav** [IN/US]; 936 South Bell Avenue, Apartment #2R Rear, Chicago, IL 60612 (US).

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(74) Agent: **TAYLOR, Arles, A., Jr.**; University Tower, Suite 1400, 3100 Tower Boulevard, Durham, NC 27707 (US).

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(71) Applicants (for all designated States except US): UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL [US/US]; 308 Bynum Hall, Campus Box 4105, Chapel Hill, NC 27599-4105 (US). THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ILLINOIS [US/US]; 354 Henry Administration Building, 506 South Wright Street, Urbana, IL 61801 (US).

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(71) Applicants and

(72) Inventors: **XIA, Guoqing** [CN/DE]; Friedensallee 78, 22765 Hamburg (DE). **MALMSTROM, Anders** [SE/SE]; Vapenkroken 19, Lund S-22647 (SE).

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(72) Inventors; and

(75) Inventors/Applicants (for US only): **LIU, Jian** [US/US]; 106 Ivy Brook Lane, Chapel Hill, NC 27516 (US). **CHEH, Jinghua** [CN/US]; 1105 Highway 54 Bypass, Kingswood, Apartment Q-7, Chapel Hill, NC 27516 (US). **DUNCAN, Michael, B.** [US/US]; 350 Summerwalk Circle, Chapel Hill, NC 27517 (US). **SHUKLA, Deepak** [IN/US]; 8339

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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(54) Title: PURIFIED AND ISOLATED HEPARAN SULFATE 3-O-SULFOTRANSFERASE ISOFORM 5 NUCLEIC ACIDS AND POLYPEPTIDES AND THERAPEUTIC AND SCREENING METHODS USING SAME

(57) Abstract: 3-OST-5 proteins, and nucleic acid molecules encoding the same. Recombinant host cells, recombinant nucleic acids and recombinant proteins are also disclosed, along with methods of producing each. Isolated and purified antibodies to 3-OST-5 homologs, and methods of producing the same, are also disclosed. 3OST-5 gene products have biological activity in specific heparan sulfate 3-O-sulfotransferase reactions. These reactions provide unique modified heparan sulfate. Thus, therapeutic methods involving this activity are also disclosed.

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US03/21094

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : C12Q 1/00, 1/70, 1/48; C12P 1/00, 21/06; C12N 9/00, 9/10; A61K 39/395  
 US CL : 435/4, 6, 15, 41, 69.1, 69.2, 183, 193; 424/130.1, 800, 801; 930/240

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 U.S. : 435/4, 6, 15, 41, 69.1, 69.2, 183, 193; 424/130.1, 800, 801; 930/240

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 Please See Continuation Sheet

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	XAI et al. Heparan Sulfate 3-O-Sulfotransferase Isoform 5 generates both an antithrombin-binding Site and an Entry Receptor for Herpes Simplex Virus, Type 1. Journal of Biological Chemistry. 04 October 2002, Vol. 277, No. 40, pages 37912-37919, entire document.	1-4
A,E	MOCHIZUKI et al. Characterization of a Heparan Sulfate 3-O-Sulfotransferase-5, an Enzyme Synthesizing a Tetrasulfated Disaccharide. Journal of Biological Chemistry. 18 July 2003. Vol. 278, No. 29, pages 26780-26787.	1-11, 13-60
A,E	XU et al. Characterization of Heparan Sulphate Sulphotransferase Isoform 6 and Its Role in Assisting the Entry of Herpes Simplex Virus, Type 1. Biochemical Journal Immediate Publication. August 2004. pages 1-25 plus Figures 1-8.	1-11, 13-60
A	YABE et al. Portable Sulphotransferase domain determines sequence specificity of heparan sulphate 3-O-sulphotransferases. Biochem. J. September 2001, Vol. 359, pages 235-241.	1-11, 13-60
A,P	KRAMER et al. Heparan Sulfate Core Proteins in Cell-Cell Signaling. Annu. Rev. Genet. July 2003. Vol. 37, pages 461-484.	1-11, 13-60
A,E	Database EMBL on STN, Sequence Version Archive for Accession Number or Sequence Version: AF503292. Printed 15 September 2004. Total Pages 7.	1-11, 13-60

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

15 September 2004 (15.09.2004)

Date of mailing of the international search report

07 OCT 2004

Authorized officer

Emily Ne

Telephone No. (571) 272-1600

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450

Faxsimile No. (703) 305-3230

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US03/21094

**Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)**

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claim Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claim Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
Claim 12 is unsearchable because it recites a dependency to claim 111. Claim 111 does not exist in the instant application.
  
3.  Claim Nos.: 12  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest  The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/US03/21094

**Continuation of B. FIELDS SEARCHED Item 3:**

Medline, Pubmed, and EAST.

Keywords: 3-OST-5, 3-OST\$, sulfotransferase